Valuation of Municipal Streetlighting Equipment in Haverhill

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The MECo Approach

Town-by-Town Method

The most important difference between Haverhill and MECo on the valuation of the streetlights is the determination of accumulated depreciation in streetlighting equipment in the city. As shown on page 27 of Exhibit MECo-1, and explained further in City of Haverhill Record Request 1, MECo computes accumulated depreciation (which MECo calls "recorded reserve") on streetlights in Haverhill by

- determining the dollars of streetlighting plant (FERC Account 373) installed in Haverhill in each year 1963–1997 and remaining in service at 12/31/97 (column G of MECo-1, p. 27), and
- multiplying that Haverhill gross plant for the year by the ratio of accumulated depreciation (column C of MECo-1, p. 27) to gross plant (column B of MECo-1, p. 27) for MECo total streetlighting, to determine accumulated depreciation from plant installed in that year (column H of MECo-1, p. 27).

Unamortized streetlighting investment in Haverhill is then determined as the summation over the range of installation years of gross plant ($1,807,775), minus the summation over the years of accumulated depreciation ($314,107). The unamortized plant is thus $1,493,668. (See "totals" line of MECo-1, p. 27.)

MECo then makes two adjustments to this total unamortized plant. First, MECo subtracts the portion of Account 373 that is attributable to plant not being sold, such as

conduit and conductors. From accounting records, MECo estimates that the gross saleable plant in Haverhill is $1,549,829, or 85.73% of the Account 373 total. MECo estimates the fraction of accumulated depreciation on the Account 373 in Haverhill that is saleable to be 83.29%. The results of this adjustment are shown in Exhibit MECo-1, TMB-3, in the top right corner of pages 3–95.

Second, MECo must estimate the portion of saleable Account 373 investment in Haverhill that comprises municipal streetlighting, as opposed to private lighting. This fraction is not based on accounting data. MECo estimates the gross plant and accumulated depreciation for each light, based on its type (and hence its current cost) and MECo's recorded date of installation. These estimates are then reconciled to the city-wide values, and the costs of the lights on the municipal accounts are added up to determine the unamortized cost of the City's lights. Part of this computation is shown in Exhibit MECo-1, TMB-4; the entire computation is laid out in City of Haverhill Record Request 2.[1] MECo estimates the municipal share of net plant to be 89.94%.

System-wide Approach

MECo starts with its system-wide plant in service for streetlighting, and subtracts the plant not subject to sale (Exhibit Haverhill-3, Tab D). MECo then estimates accumulated depreciation as the system-wide plant subject to sale, times the ratio of total allocated streetlighting accumulated depreciation to total streetlighting plant (Exhibit MECo-1, TMB-2, p. 2).

MECo then allocates the saleable net plant to each type of luminaire or pole in proportion to base rates for that type of luminaire or pole. (Exhibit MECo-1, TMB-1, p. 2) Each municipality's purchase price would be determined by adding up the allocated net plant for each of the luminaires and poles the municipality wished to purchase.

MECo estimates that total purchase cost for all Haverhill municipal streetlighting equipment would be $1,005,672.

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[1] The values in Exhibit MECo-1, TMB-4 do not quite match those of City of Haverhill Record Request 2. MECo has not explained why.

MECo's Error in Determining Accumulated Depreciation

MECo seriously understates the accumulated depreciation associated with streetlighting equipment in Haverhill. MECo has asserted that it historically used a 4% depreciation rate for streetlighting equipment (e.g., see the 4% depreciation rate in Exhibit MECo-1, TMB-3, so accumulated depreciation for streetlighting plant should equal 4% times the age of the plant in years, times the gross plant of that age. In MECo-1, p. 27, however, the accumulated depreciation is consistent with a 2.40% depreciation rate on plant installed in 1997, falling to as little as 2.07% for plant installed in 1963.

MECo has not explained this discrepancy directly. However, its explanation of its method for allocating depreciation to years appears to be that it reduces accumulated depreciation in any year to reflect any shortfalls. (See the first page of the text Attachment to Haverhill Record Request 1, under points 2 and 3; and Attachment I Columns E and G.) In other words, MECo is not computing the unamortized cost of the plant being sold, but rather the unamortized cost of whatever plant MECo has installed and removed over time. Accumulated depreciation is thus reduced by the unamortized value of any retired plant, such as the mercury-vapor lights MECo replaced with high-pressure sodium through the 1980s and 1990s.

Correction of Town-by-Town Method

The depreciation error is corrected in Table 1, using a 4% depreciation rate throughout. Accumulated depreciation on total streetlighting plant in Haverhill at 12/31/97 was actually $545,617, rather than the $314,107 reported by MECo.

Table 2 carries this correction one step further. MECo has actually used depreciation rates for streetlighting that were higher than 4% over much of the relevant period. I have examined MECo's FERC Form 1 for numerous years, and found only three that report streetlighting depreciation rates: 5% for 1976, 4% in 1980, and 4.35% in 1991. Table 2 assumes that the 1976 rate applied from 1963 to 1979, the 1980 rate from 1980 to 1990,

and the 1991 rate from 1991 to 1997. These higher depreciation rates increase the accumulated depreciation on total streetlighting plant in Haverhill at 12/31/97 to $559,038.

Interestingly enough, MECo recognizes that its method understates accumulated depreciation for streetlighting. Attachments IV–VI of Haverhill Record Request 1 show the development of Haverhill streetlighting investment under the method MECo intends to use after 12/31/98. This approach estimates that 12/31/97 accumulated depreciation on total streetlighting plant in Haverhill was $547,412, virtually the same as my estimate and 70% more than the value MECo proposes to use in determining the sales price of Haverhill's streetlights.

Both Table 1 and Table 2 use MECo's estimate of the portion of streetlighting plant that is saleable, and the portion of saleable plant that is municipal. The resulting estimates of unamortized costs for municipal lights are $985,166 and $975,112, compared to MECo's estimate of $1,158,596.

Correction of System-wide Method

The accumulated depreciation for the MECo system is computed in Table 3, using a 4% depreciation rates in place of MECo's 2.07–2.40% depreciation rates. This represents the accumulated depreciation on the equipment still in service and subject to sale, without adjustment for prematurely retired equipment. The resulting net plant is 78% of MECo's estimate. Using this net plant value would reduce MECo's charge for each luminaire or pole by 22%. The Haverhill purchase price would thus be $787,042.

Table 4 repeats this computation for the depreciation rates actually used for streetlighting over the years, and determines a Haverhill purchase price of $745,057.

MECo Error in Assigning Ages to Equipment

Errors in Recent Ages

MECo has understated the age, and hence overstated the cost, of City lighting in two ways. First, for all lights that were found in an April 1998 inventory review to be not properly recorded on its lists of light locations, MECo has assumed that the lights and poles were installed in 1998. This is obviously incorrect. These lamps were installed long before 1998, regardless of when MECo first determined their actual location.

Second, MECo has not recorded the installation dates of poles separately from the installation costs of luminaires. Hence, the poles on which incandescent and mercury vapor lamps were installed in the 1950s and 1960s were recorded as having been installed in the 1990s, when the older lamps were replaced with high-pressure sodium.[2]

As MECo's method for determining the municipal portion of the lighting plant recognizes, older equipment was less expensive to build and is more heavily depreciated. MECo's errors thus overstate the portion of the saleable plant that is allocated to the municipal accounts.

The City has repeated the analysis in Exhibit MECo-1, TMB-3, with the saleable costs developed in Table 2, and with two changes in timing of the municipal equipment in Rates S2B and S3A (the two largest municipal rates): poles were estimated to have been installed in 1978,[3] and any equipment to which MECo assigned a date of 1998 were redated to 1994, the average age of the municipal luminaires. That analysis results in a

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[2] The same is undoubtedly true to a large extent for the brackets, many of which were probably retained when the mercury-vapor lamps were converted to high-pressure sodium. MECo assumes that the brackets were all replaced at the time the luminaires were changed out. Reflecting the greater age of the brackets would probably further reduce the municipal share of the Town-specific costs.

[3] This is an age of 20 years, and corresponds to a period after the installation of most of the mercury-vapor lights, for which most of the poles were originally installed. Since some poles may have been added more recently, I used 1978 as a compromise date. The reasonableness of the 1978 date is confirmed by the fact that MECo dates the poles supporting mercury-vapor lights (codes 04, 05, and 24) to 1978, even though adjacent poles supporting high-pressure sodium lights are listed as having been installed in 1994–1996. See Exhibit MECo-1, TMB-3, especially pp. 102–104.

total municipal cost of $954,746, about $20,000 less than the estimate from Table 2, which used MECo's assumptions about the municipal share of the net lighting plant.

The analysis, which uses MECo's spreadsheet with the three changes noted (use of Table 2 saleable costs and the two changes in timing), is too large to reproduce here. Table 5 shows MECo's summary page for the worksheet, with my corrections, and Table 6 shows the detailed analysis for the equipment on Alpine Dr.

Errors in Ages of Older Plant

MECo's investment data (e.g., in Exhibit MECo-1, page 27) start in 1963, both for Haverhill and for the system as a whole. MECo reports the 1963 investment to be much larger than in subsequent years: as much as the next 11 years combined for Haverhill and the next 14 years combined for the system. Clearly, these are not all 1963 installations. The 1963 entry must be the remaining inventory of equipment that had been installed by 1963, when MECo established the depreciation records it currently uses. Since the equipment was installed earlier than MECo reports, it must also be more heavily depreciated.

The first step in determining accumulated depreciation for this older equipment is to distribute its ages over time. I did that by looking at a series of later years and for each year (e.g., 1973) asking "If we only had cumulative data to 1973, what percentage of the cumulative additions actually occurred in 1973?" Table 7 shows the ratio of remaining streetlighting plant installed in or before each year 1964–1973 that was installed in that last year (e.g., the fraction of pre-1974 plant that was installed in 1973), for both Haverhill and the MECo system. Over those periods, an average of 6.6% of Haverhill streetlighting plant and 5% of system streetlighting plant was installed in the last year. Applying these ratios to the pre-1964 total plant gives 1963 investment of $2,270 for Haverhill and $234,928 for the system.

If I had repeated this computation for the pre-1963 data, I would have derived a slowly declining investment pattern that stretched back indefinitely. Instead, I fixed the annual investment at the 1963 estimate, and extrapolated it back until all investments were accounted for. The results are shown in columns 4 and 8 of Table 7. Some plant was

probably added earlier than these dates, so from the City's perspective, my assumptions are conservative.

In Table 8, I compute the unamortized balance of streetlighting plant in Haverhill as of 12/31/97, assuming the pre-1964 investment was actually distributed as shown in Table 7. The municipal portion of that investment is $965,870 using MECo's estimate of the municipal fraction (which incorporates the wrong ages for lights and poles) and $945,697 using my corrected estimate of the municipal fraction.[4] These values are $9,000 or $10,000 lower than the corresponding estimates in Table 2.

In Table 9, I similarly correct the system-wide computation shown in Table 4, and derive a Haverhill municipal unamortized plant value of $708,632, which is $36,000 lower than shown in Table 4. The effect of the age correction is more important for the system-wide data, since a higher percentage of the remaining investment was installed prior to 1964 for the system than for Haverhill.

Updating to 12/31/98

The depreciation rates applicable to streetlighting increased to 8.13% on April 1, 1998, under the terms of the MECo restructuring agreement. A small part of this rate (0.74%) is attributed to negative net salvage, which does not apply in the case of a sale of equipment in place, and should thus be treated as ordinary depreciation. Hence, depreciation from 12/31/97 to 12/31/98 will be three months of depreciation at 4% and nine months at 8.13%, or 7.10% overall. Assuming that there is no change in gross plant, streetlighting plant in Haverhill would accrue about $128,352 of additional depreciation in 1998, of which about $116,000 would be attributable to municipal streetlighting. Table 10 shows the Town-specific method computation of 12/31/98 unamortized Haverhill municipal streetlighting investment of $851,553 for my correction of MECo's age assumptions (or $869,718 with MECo's age assumptions).

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[4] The fraction is calculated in Table 2, as the ratio of the municipal share in Table 5 to the corresponding total net investment in Haverhill: $954,746 ÷ $1,084,192 = 0.8806.

The effects of another year's depreciation on the system-wide method is more difficult to determine, since some additions are likely to occur. On the other hand, total streetlight number may increase, offsetting part of the increased cost per light. If additions are minimal, the 7.1% depreciation of the $60.6 million in saleable gross plant would increase accumulated depreciation by $4.4 million. As shown in Table 11, this would reduce net plant in Table 9 by about 13%, bringing the Haverhill allocation to about $615,000.